

IOWATER, Iowa's Statewide Volunteer Water Quality Monitoring Program

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Biological Sketch of Author

Richard has held a variety of biologist, naturalist, and ranger positions within the U.S. Forest Service, National Park Service and Minnesota Department of Natural Resources. His extensive experience with both the scientific community and public relations lend themselves well to coordinating the IOWATER program for the Iowa Department of Natural Resources for the last two years. Richard holds a Bachelor of Science degree in biology: ecology from Mankato State University (MN) and a degree in natural resources technology from Central Lakes College (MN). He is currently working on a Master of Science in animal ecology from Iowa State University.

Abstract

Historically, relatively little data exists on the quality of Iowa's streams, rivers and lakes. State and federal agencies seek information on surface water quality to address regulatory compliance to the Clean Water Act. Local policy-makers and public conservation coalitions demand attention to the ecological health of surface waters to address human health concerns, economic issues such as tourism, and land-use issues such as confined animal feeding operations and agricultural fertilizer and pesticide use.

Unfortunately, public staffing and funding to address these concerns have not kept up with the need. In 1998, the State of Iowa created a statewide volunteer water-quality monitoring program called IOWATER. The program provides supplemental data to fill "gaps" in professional information and contributes toward public ownership and responsibility.

IOWATER's main focus is training workshops that are scattered across the state. These workshops are conducted both in classrooms and streams, using biological, chemical, physical and stream-habitat assessments. Ultimately volunteers decide on their monitoring regime based on the questions they are trying to answer. Early comparison of the IOWATER data to that being collected professionally shows a good match in overall trends.

The IOWATER program is an expanding partnership overseen by an advisory council that includes volunteer monitors and several organizations across the state. IOWATER is administered and funded by the Iowa Department of Natural Resources through state and federal monies.

Introduction

IOWATER is a vital component of the Iowa Department of Natural Resources' Ambient Monitoring Program. Most of Iowa's 72,000 miles of streams remain untested by professionals and citizen monitors often fill in the "gaps" left in water-quality information. Volunteer monitoring in the state is not a new concept; the statewide framework that IOWATER provides is new.

Water quality continues to be one of top environmental concerns of the citizens of Iowa. IOWATER provides an opportunity for citizens to take an active role in monitoring and protecting the quality of Iowa's waters. This citizen-based program is directed by the needs of local communities and individuals, allowing them to design their own monitoring plans. These plans will vary, from a fifth grade class testing water once a year, to a conservation club testing several sites monthly, to a concerned farmer monitoring a stream adjoining his field.

IOWATER Workshops

Level 1 Workshops. IOWATER's main focus is to provide water-quality monitoring workshops. These workshops, scattered across the state, have a variety of sessions in classrooms and in the stream. Monitoring includes: **1) Biological Assessments.** "Benthic macroinvertebrates" (bottom-dwelling aquatic insects, snails, etc.) are used as indicators of stream health. Volunteers also assess plant and algae growth. **2) Chemical Assessments.** Although the chemical quality of streams fluctuates with season, time of day, weather and land use, this monitoring gives a "snapshot in time" of a stream's quality. Field kits are used to measure nitrate-N and nitrite-N, ortho-phosphate, pH and dissolved oxygen. **3) Physical Assessments.** Stream measurements include water temperature, width, depth, velocity and water clarity. **4) Stream Habitat Assessments.** Assessing stream habitat is important in tracking changes through time. Volunteers observe and record conditions of the streambed, stream banks, canopy cover, adjacent land use and the riparian (water's edge) ecosystem.

Monitoring strategies are discussed, but ultimately volunteers decide where to monitor, how often to monitor and what techniques to use based on the questions they are trying to answer. Over 1,000 volunteers have been trained at Level 1 workshops during 2000 and 2001.

Level 2 Workshops. These workshops were introduced in 2001, for those trained at Level 1 with the interest and commitment to expand their involvement. This 8-hour workshop consists of classroom sessions that provide specific help on designing a monitoring program, preparation of a "Quality Assurance Project Plan," and methods for interpreting collected data. Stream sessions include chloride monitoring as well as general coliform and *E. coli* bacteria (types of bacteria present in the intestinal tract of warm-blooded animals). Over 110 volunteers were trained at Level 2 workshops in the summer of 2001. Participants are certified as Level 2 citizen monitors upon completion of Level 2 training and at least one Level 2 "module."

Level 2 Modules. In addition to Level 2 workshops, the following advanced 4-hour training modules are offered: **1) Benthic Macroinvertebrate Indexing.** Monitors are trained to identify a wider variety of organisms, as well as the number of organisms present. With this information, data summaries, or "metrics" are calculated to better assess the condition of the stream. **2) Standing Waters.** This module provides training to monitor lakes, ponds and wetlands. Many of the tests used in Level 1 stream monitoring are adapted for standing waters, in addition to water clarity using a secchi disk, water-color characterization, and aquatic plant identification. **3) Soil Monitoring.** This module focuses on the ecological health of soil using indicators such as water infiltration rates, soil chemistry, and stability of soil aggregates to wetting. Over 230 participants were trained at Level 2 modules in the summer of 2001.

Two new modules will be added in 2002: **4) Water Ecology.** This module will be an interpretive training to explain the principals of the ecology of water in Iowa. Topics will include stream hydrology, water food webs, and watershed/non-point pollution sources and solutions. **5) Secondary Educators.** This module is specifically created to incorporate IOWATER into high school and college classrooms, and introducing materials from national programs such as Project WET and Project WILD Aquatic. Educators will be able to earn staff development credits or graduate credit for completing IOWATER Level 1 and the Secondary Educators module.

IOWATER Data: The Building of Credibility

The IOWATER Web site (www.iowater.net) has become an active resource for volunteers, environmental professionals, and the people of Iowa. This site has workshop schedules, the IOWATER database, resources for volunteer monitors, and "The Iowa Citizen Monitor" (the newsletter of IOWATER.)

IOWATER's online database was developed for volunteers to register monitored sites, submit data they collect, and access data being collected by others in Iowa. Only trained volunteers can submit data, however anyone can access the data. Water-quality data can be retrieved by site, county, watershed, or using a map-based Arc-View Geographic Information System program. As of April of 2002, there are over 800 monitoring sites registered.

Early comparison of the volunteer data to that being collected professionally (by the Iowa Department of Natural Resources and the University Hygienic Laboratory - University of Iowa) shows a good match in overall trends. Testing methods used by the IOWATER program and the data collected by volunteer monitors will continue to be evaluated and changes to testing procedures will be made where necessary.

Watershed Approach

The structure of IOWATER allows volunteers to monitor not only for specific problems but also to track the many inputs of a larger water network. In 2001, IOWATER began tracking watershed groups within its ranks. A watershed directory was developed as groups submitted their data, methods and monitoring plans to IOWATER staff.

Many existing groups have adopted IOWATER techniques for their monitoring programs. Because of IOWATER's flexibility, they choose the program resources that best fit the group's needs. Many new groups are forming using IOWATER as the framework for their projects. IOWATER staff cultivates these efforts by offering resources, equipment, and staff support at meetings and conferences.

The Future of Citizen Monitoring in Iowa

IOWATER will continue to educate the public about watersheds and water quality, in addition to assisting citizens in taking responsibility to monitor and protect their local waters. Future plans for IOWATER include creating a grant program to assist citizens in their monitoring efforts, creating data summary reports for watershed groups and the local media, and developing urban stream-monitoring programs.

This statewide comprehensive and organized approach is promising a strong foundation for uncovering the many stressors that affect watersheds. More complete data is collected to use in determining what actions are needed to protect or restore the resource. As individuals become interested in their local watershed, they often become more involved in decision-making, protection and restoration efforts. Watershed monitoring builds a sense of community, increases commitment to meeting environmental goals, and ultimately, improves the likelihood of success for environmental programs. IOWATER is making "waves of difference" across Iowa.

References

IOWATER - Sustaining the Wave. Iowa Department of Natural Resources - Geological Survey Bureau. Iowa City, Iowa: Jan. 2002.